

REMARKS

Claims 6-10 are currently pending in the instant application.

Claims 1-5 have been canceled without prejudice. No new matter is added by cancellation of the claims and no additional claims fees are necessitated. A complete listing of all claims ever presented in accordance with 37 C.F.R. §1.121(c)(1) is set forth herein. Accordingly, entry of the amendments made herein is proper and respectfully requested.

In the Office Action, the Examiner sets forth eight separate anticipation rejections under 35 U.S.C. §102. More specifically, the Examiner rejects claims 1-10 under 35 U.S.C. §102(b) or (e), as appropriate based on the reference, as being anticipated by each of:

U.S. Patent No. 6,638,694 of Ikemoto, *et al.* ("Ikemoto");

U.S. Patent No. 6,440,326 of Maruyama, *et al.* ("Maruyama");

U.S. Patent No. 5,846,695 of Iwata, *et al.* ("Iwata");

U.S. Patent No. 5,968,848 of Tanabe, *et al.* ("Tanabe '848");

U.S. Patent No. 5,905,063 of Tanabe, *et al.* ("Tanabe '063");

U.S. Patent No. 5,705,089 of Sugihara, *et al.* ("Sugihara");

U.S. Patent No. 5,567,574 of Hasemi, *et al.* ("Hasemi"); and

U.S. Patent No. 5,174,816 of Aoyama, *et al.* ("Aoyama").

While not necessarily agreeing with the Examiner's rejections nor the arguments and contentions in support thereof, in an effort to expedite the prosecution of method claims 6-10, Applicant has canceled claims 1-5, without prejudice. Accordingly, the Examiner's rejections with respect to claims 1-5 are rendered moot.

Applicant respectfully traverses each of the Examiner's rejections and the arguments and contentions set forth in support thereof with respect to claims 6-10 for at least the reasons set forth below.

To begin with, Applicant's claimed invention is directed to methods of producing a semiconductor device, comprising forming a copper wiring *by chemical mechanical polishing* and washing with washing liquid for a semiconductor substrate, wherein the washing liquid comprises a basic compound and at least one selected from the group consisting of sugar alcohols and saccharides.

Applicant respectfully submits that none of the references cited by the Examiner in the Office Action teaches methods of forming copper wiring which include chemical

mechanical polishing. Moreover, none of the references teaches the subsequent washing of a substrate that has been subjected to chemical mechanical polishing with the claimed washing liquid.

As set forth in Applicant's Specification at page 3, lines 13-22, Applicant's invention is specifically directed to the washing of semiconductor substrates subsequent to the preparation of copper wiring which involves chemical mechanical polishing. It is further pointed out in this portion of the Specification that the undesirable materials left behind by chemical mechanical polishing and the methods of removing the same are entirely different from the removal of photoresist material residues and ashing residues left by alternative processes.

Ikemoto is specifically directed to a resist stripping agent. As set forth in the Summary of the Invention in Ikemoto, the invention is directed to a resist stripping agent comprising a specific alkanolamide. The disclosed invention is for the purpose of removing patterned resist films and resist residues which remain on a semiconductor surface after etching and/or ashing. (*See*, Ikemoto, column 2, lines 23-31). Ikemoto contains no teaching regarding the formation of copper wires involving the use of chemical mechanical polishing and does not teach the use of any of the disclosed ingredients taught for use in a resist stripping agent in a process employing chemical mechanical polishing. Thus, Applicant respectfully submits that Ikemoto fails to anticipate the claimed methods.

Maruyama is also specifically directed to a photoresist removing composition. (*See*, Maruyama, Title). The resist removing composition disclosed in Maruyama includes a quaternary ammonium hydroxide, an amine and a sugar or sugar alcohol, in addition to other ingredients. However, Maruyama does not disclose any methods for forming copper wirings which include the use of chemical mechanical polishing. Accordingly, Maruyama fails to disclose the use of any of the photoresist removing compositions taught therein for use in conjunction with a process as claimed. Accordingly, Applicant respectfully submits that Maruyama fails to anticipate the claimed methods.

Iwata is also directed to a composition for removing photoresist materials. Iwata does not teach the use of chemical mechanical polishing in the processes taught therein. Iwata specifically provides that the removing agent composition disclosed therein is used "for removing a photoresist layer applied onto an inorganic substrate, a photoresist layer which is left remaining after dry etching of an inorganic substrate mast with a photoresist layer, or residues of a photoresist which are left remaining after dry etching ... and subsequent ashing of the photoresist layer." (*See*, Iwata, column 4, lines 40-47). Accordingly, Applicant respectfully submits that Iwata fails to disclose methods as claimed involving the use of chemical mechanical

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polishing followed by washing with a liquid comprising a basic material and at least one sugar alcohol or saccharide.

Both Tanabe '848 and Tanabe '063 are also directed to rinse solutions for the removal of photoresist materials. Tanabe '063 specifically states in the Abstract that the invention is directed to "a remover solution composition for resist which comprises ...a method for removing resist which comprises" (*See*, Tanabe '063, Abstract). Tanabe '848 is similarly directed to treating substrates which have been subjected to lithographic procedures. Neither Tanabe '848 or Tanabe '063 discloses a process for forming copper wiring employing chemical mechanical polishing and the subsequent washing of the semiconductor substrate having a copper wiring with a washing liquid comprising a basic material and at least one selected from sugar alcohols and saccharides, as claimed. Thus, neither Tanabe reference anticipates the claimed invention.

Similarly, with respect to Sugihara, Hasemi and Aoyama, none of the references teaches copper wire formation methods that involve chemical mechanical polishing, nor do the references disclose the use of the rinse liquids taught therein for removing the undesirable materials left behind by chemical mechanical polishing. Thus, Applicant respectfully submits that none of Sugihara, Hasemi or Aoyama anticipate the claimed invention.

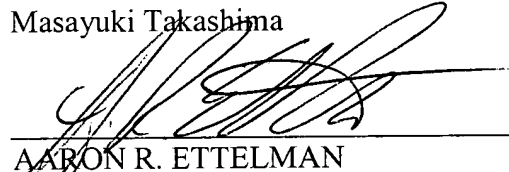
In view of the Remarks made herein, Applicant respectfully submits that claims 6-10 patentably distinguish over the prior art of record and known to Applicant. Accordingly, reconsideration, withdrawal of the rejections and a Notice of Allowance are respectfully requested.

Respectfully submitted,

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(Date)

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Enclosure – Petition for Extension of Time (two months)